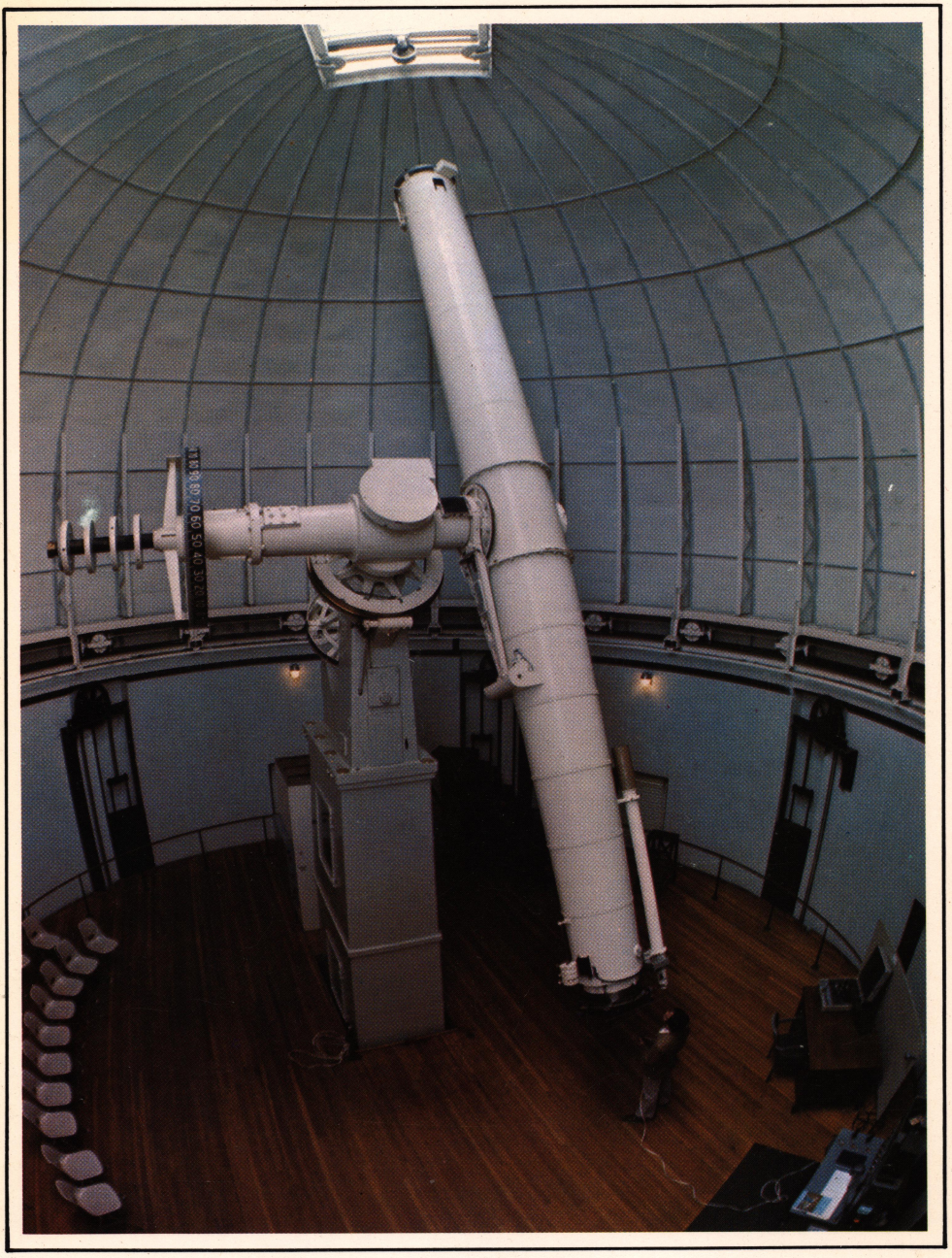
UNITED STATES NAVAL OBSERVATORY

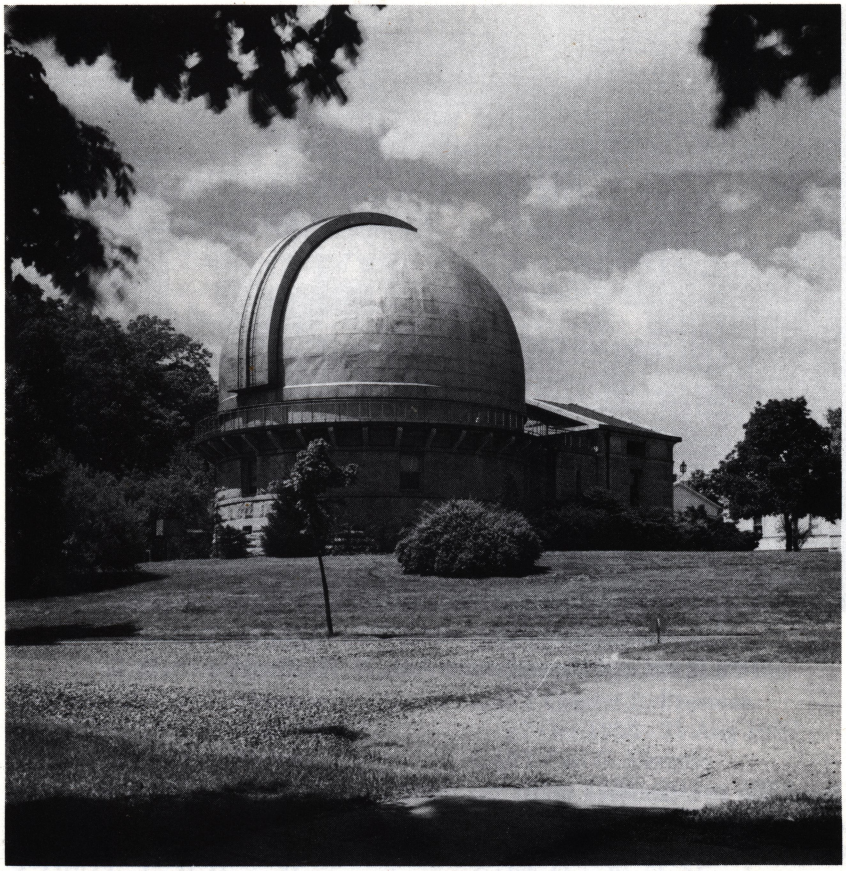


"There is no richer field of science opened to the exploration of man in search of knowledge than astronomical observation; nor is there, in the opinion of this committee, any duty more impressively incumbent upon all human governments than that of furnishing means and facilities and rewards to those who devote the labors of their lives to the indefatigable industry, the unceasing vigilance, and the bright intelligence indispensable to success in these pursuits."

John Quincy Adams, 1842

In the year 1825, President John Quincy Adams first went before the Congress of the United States to plead support of his "lighthouses of the sky." He was distressed that in all the American hemisphere there was not a single astronomical observatory. There were grave doubts that Congress had authority to establish such an institution, and for many years Adams' appeals for a national observatory went unheeded. Finally, in 1842, Congress authorized "a suitable house for the Depot of Charts and Instruments of the Navy" to be established. It became the United States Naval Observatory in 1844.

Cover Photograph:
The historic 26-inch refracting telescope of the Naval Observatory in Washington, D.C., is now in its second century of continuous operation. Built in 1873 by Alvan Clark and Sons, it has been modernized to carry on essential programs requiring long focal length and the high resolution for which large refractor objectives are noted.



The 26-Inch Telescope Dome

THE UNITED STATES NAVAL OBSERVATORY

MISSION

"Make such observations of celestial bodies, natural and artificial, derive and publish such data as will afford to United States Naval vessels and aircraft as well as to all availing themselves thereof, means for safe navigation, including the provision of accurate time; and while pursuing this primary function, contribute material to the general advancement of navigation and astronomy."

The United States Naval Observatory, the oldest scientific institution in the Navy was developed in Washington, D. C., in 1830 from a small office in the Navy Department, called the Depot of Charts and Instruments, which cared for chronometers, charts, and other navigational equipment. This office set up a small transit instrument for the rating of chronometers. In 1844, the

U. S. Naval Observatory, James Melville Gilliss Building, 34th Street and Massachusetts Ave., N. W., Washington, D. C.

Depot was re-established under the name of the U. S. Naval Observatory and was located on the knoll north of where the Lincoln Memorial now stands. For nearly 50 years the Naval Observatory remained in this location. During this period, many new instruments were acquired, including the 26-inch refractor which was obtained in 1873. The old Naval Observatory building, still in use by the Navy, was declared a National Historical Monument in 1965. The Naval Observatory was moved to its present site in 1893. At this time, the Nautical Almanac Office, which had been established by the Navy Department in 1849 at Cambridge, Massachusetts, and had been transferred to Washington in 1866, was moved to the Naval Observatory.

In addition to the Washington, D. C., installation, the Naval Observatory maintains a Time Service Substation at Richmond, Florida, near Miami, and an Astronomical Observing Station at Flagstaff, Arizona, 7,600 feet above sea level.

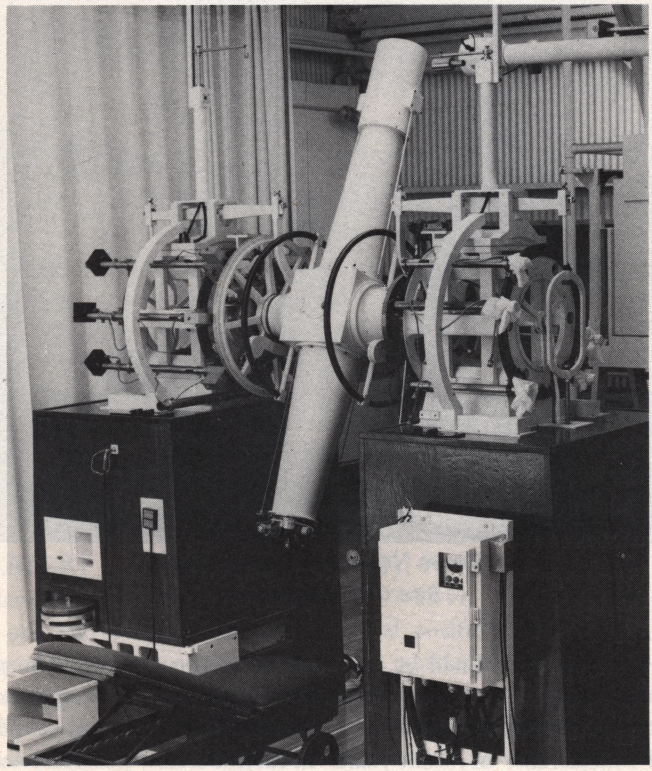
The Naval Observatory expects to conduct a program of observations with its seven-inch transit circle in the Southern Hemisphere, probably New Zealand, in the 1980's. The purpose of the program is to improve the known position of southern stars, the majority of which are too far south to be seen from Washington.

The primary purpose of the Naval Observatory is to provide accurate time and other astronomical data which are essential for safe navigation at sea, in the air, and in space.

For this purpose, it is necessary for the Naval Observatory to maintain continual observations for determining positions and motions of the sun, moon, planets, and principal stars. From some of these observations, time is determined; and upon others are based the tables and star catalogs which are used in preparing the annual navigational almanacs that give the predicted positions of the sun, the moon, the bright stars, and the planets.

These same services which are essential for navigation are also needed for many other purposes. Accurate time is indispensable for numerous technological, commercial, and scientific purposes; and, the predicted positions of the celestial bodies are extensively used by surveyors, engineers, and astronomers.

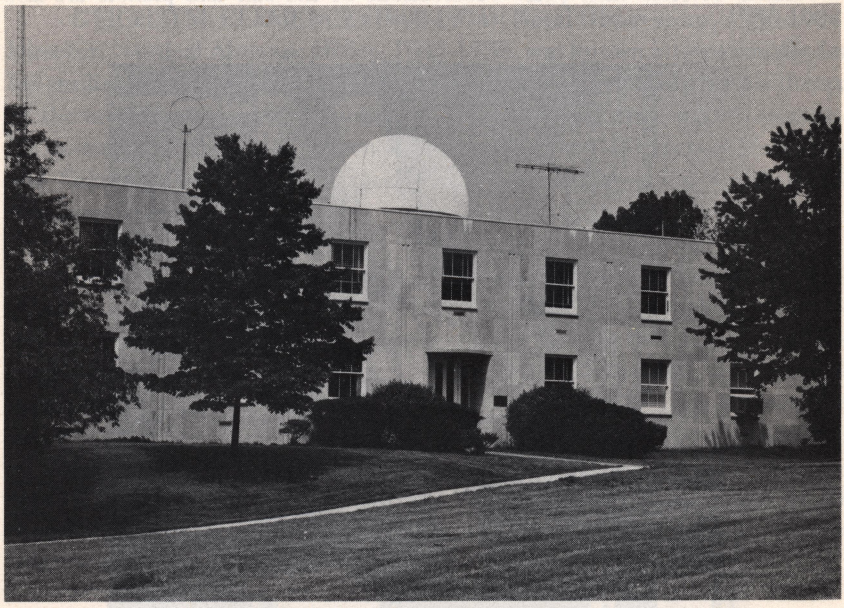
The Naval Observatory is one of the few institutions in the world, and the only one in the United States, at which fundamental positions of the sun, moon, planets, and stars are continually determined. The telescopes principally used for this purpose are called transit circles. These specially designed telescopes are restricted to motion in the north-south vertical plane and are used to view an object only as it crosses the meridian. The Naval Observatory's six-inch and seven-inch transit circles are used to measure the positions of thousands of stars each year. Observations of the sun and planets are also



Six-Inch Transit Circle

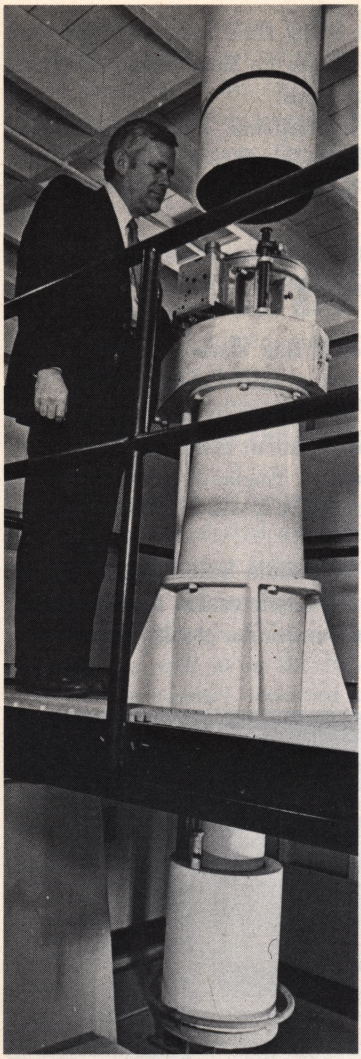
obtained to determine the positions of the celestial equator and vernal equinox, which form the basis of the celestial coordinate system.

The Naval Observatory is the only astronomical observatory in the United States that determines time. It is the source of all standard time used in the country. The Naval Observatory controls the distribution of precise time and time interval (frequency) from Naval radio stations, from satellites, and from the radio navigation system, Loran-C, operated by the U. S. Coast Guard. The Navy VLF navigation system OMEGA and the satellite navigation system TRANSIT are synchronized with the Naval Observatory master clock. The new Global Positioning Satellite System will be similarly synchronized. Radio Stations WWV and WWVH of the National Bureau of Standards also transmit time closely coordinated with the Naval Observatory. Precise clock time is distributed by the Naval Observatory to its time reference stations worldwide via communications satellites with a precision of one tenth of a millionth of a second. Precise time to a millisecond (degraded by telephone circuit delays) may be obtained by calling (202) 254-4950.



Simon Newcomb Laboratory
Site of Time Center

Time was first determined by the Navy Department in 1830 to meet the needs of navigation. These needs still exist; but, in addition, requirements for accurate time of the highest precision for scientific and technical purposes have expanded considerably in recent years. In fact, it is now necessary to provide three kinds of time: Universal Time, Ephemeris Time, and Atomic Time.



Photographic Zenith Tube

Universal Time is based on the period of rotation of the earth about its axis. In practice it is derived by observing stars as they transit, or cross, the meridian. The Naval Observatory uses a telescope of special design for this purpose, called the photographic zenith tube (PZT). The first PZT was installed at Washington, D.C., in 1915, and another at the Time Service Substation in Florida in 1949. A 65 cm PZT, the largest in existence, is now in operation in Washington, D. C. These telescopes are mounted in a fixed vertical position so that a star may be photographed as it crosses the meridian near the zenith. The time of transit is recorded by a clock. Measurement of the position of the star images on the photographs provides data to determine the clock reading when the star crossed the meridian. The position of the star is known, and the Universal Time when it was on the meridian may be computed.

The difference between the computed time and what the clock indicates tells how fast or slow the clock is. The difference is always kept smaller than a second. Adjustments of clock time become necessary about once a year and are due to a slow decrease in the rotation of the earth around its axis. The adjustment is made by adding or dropping exactly one second at the end of a month when necessary. The exact difference between astronomical time and the time signal is published weekly by the Naval Observatory to satisfy high precision requirements.

Ephemeris Time, which is defined by the orbital motion of the earth about the sun, is, in practice, determined by observing the position of the moon relative to the stars. The observations are carried out at the Naval Observatory. The position of the moon is computed in advance in terms of Ephemeris Time, and is tabulated in the Lunar Ephemeris. By comparing the observed position of the moon with that in the Lunar Ephemeris, it is possible to determine the Ephemeris Time at which the observation was made.

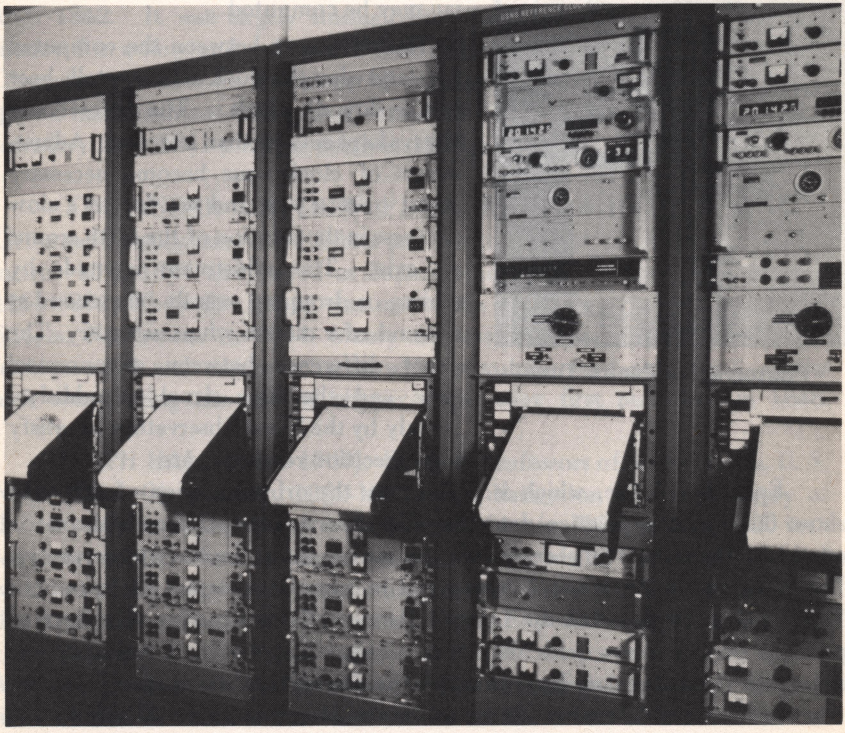
Mean Solar Time is used in civil life; it is the time ordinarily indicated by clocks. Universal Time (UT, also called Greenwich Mean Time) and Eastern Standard Time are examples of Mean Solar Time.

Whereas Mean Solar Time is not strictly uniform, Ephemeris Time is independent of the rotation of the earth, and is believed to be uniform. Both Mean Solar Time and Ephemeris Time are required in the analysis of the precise motion of the artificial satellites.

The Master Clock of the Naval Observatory determines standard time for the United States. This accurate time keeping is performed by atomic cesium beam clocks.

The basic principle of the atomic clock is that electromagnetic waves of a particular frequency are needed to make an atomic transition occur. The frequency of the cesium beam atomic clock was found to be 9,192,631,770 cycles per second of Ephemeris Time in an experiment conducted jointly by the National Physical Laboratory, Teddington, England, and the Naval Observatory. The system of Atomic Time, called A.1, was established by the Naval Observatory in 1958.

In addition to a battery of more than 20 cesium beam atomic clocks, situated in several separate but inter-connected clock vaults, the Naval Observatory also utilizes other types of atomic and molecular clocks for accurate

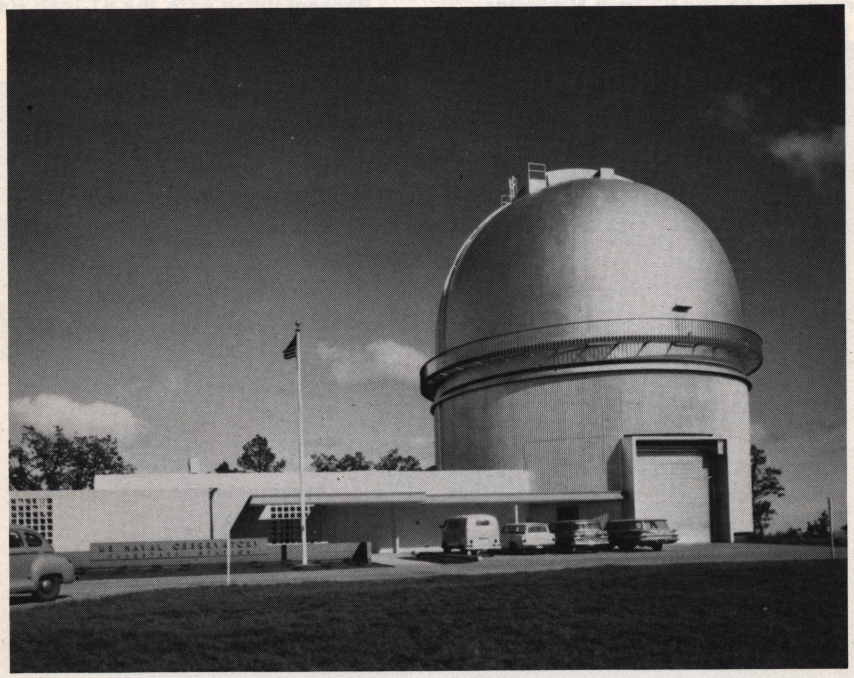


U. S. Naval Observatory Time Center

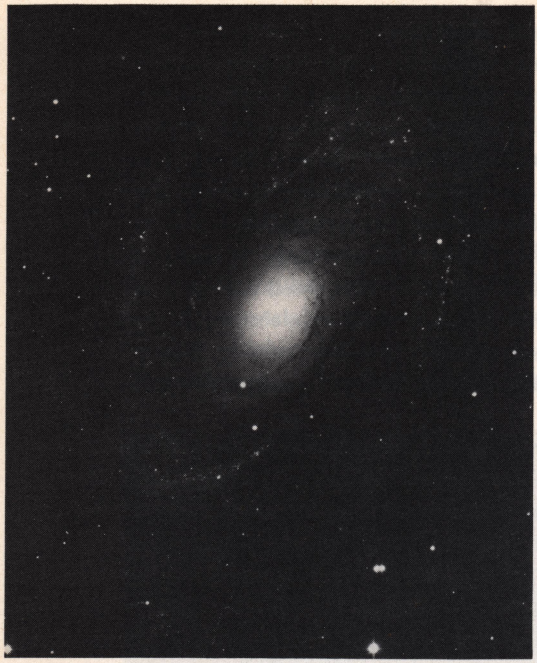
timekeeping, time distribution, and research. Rubidium vapor cells and hydrogen masers are examples of such other precise clocks. Portable atomic clocks of the cesium beam type are used by the Naval Observatory to bring time directly to those stations of the U.S. Government which require the most precise timing for their operations and for advanced research.

The rate of these atomic clocks is constant to within 1/10,000,000 of a second per day. The time scale of the Naval Observatory, which is based on the readings of all atomic clocks available at the Naval Observatory, is constant to better than 1/100,000,000 of a second per day. The need for such an extreme precision arises from several applications of modern electronic technology. The Naval Observatory, which serves as the time reference for operational electronics systems, must, therefore, provide both the greatest possible precision and reliability.

The Naval Observatory also carries out programs of astronomical research with conventional telescopes. These telescopes are called reflectors or refractors depending on whether a mirror or a lens is used as the primary light collecting and focusing component. Each telescope is equipped with an equatorial-type mounting, which has a polar axis parallel to the axis of the earth. The daily rotation of the earth can be counteracted simply by driving the telescope about its polar axis at a uniform rate of one turn a day. Thus the telescope can track celestial objects automatically.



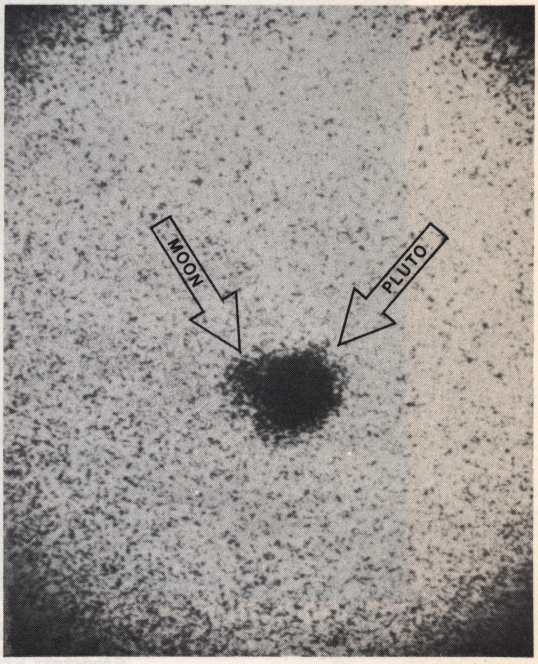
U. S. Naval Observatory
Flagstaff Station, Arizona



Spiral Galaxy Messier 81
Photographed with the 61-Inch Reflector

Spiral Galaxy Messier 51
Photographed with the 61-Inch Reflector

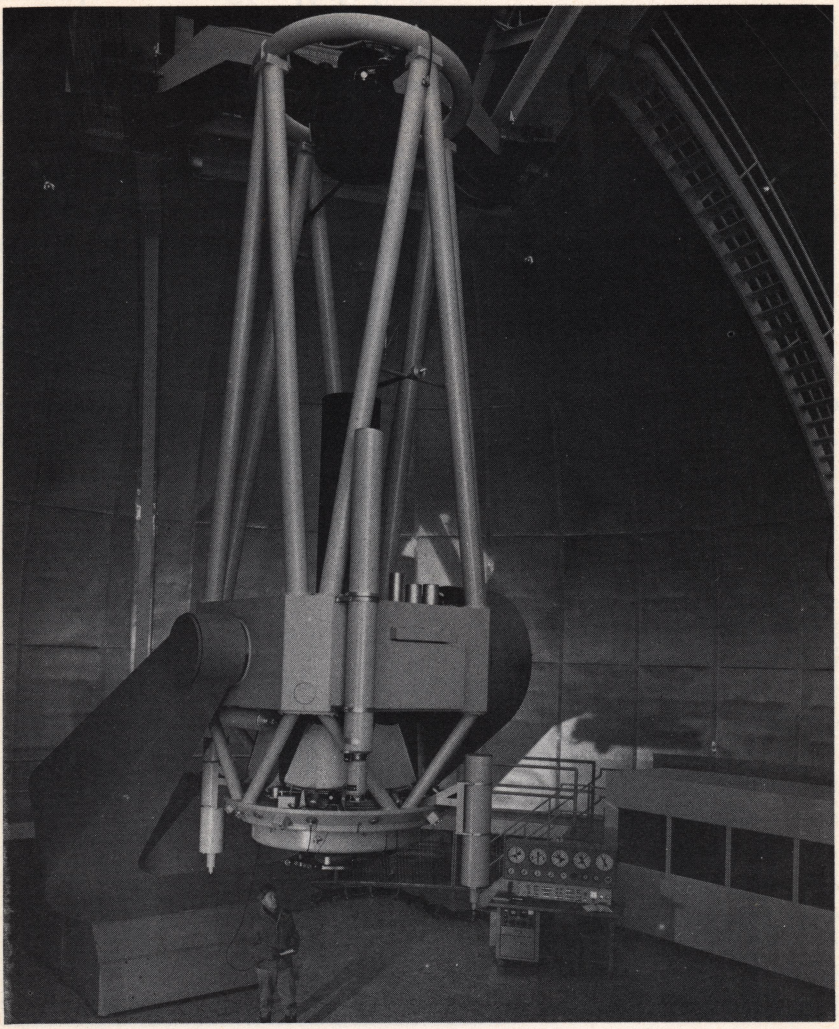
The Lagoon Nebula and associated star clouds
Photographed with the 61-Inch Reflector



Pluto with moon
Photographed with the 61-Inch Reflector

The largest telescope of the Naval Observatory is located at the Flagstaff Station in Arizona. It has a primary mirror made of fused quartz, 61 inches in diameter, with a focal length of 50 feet. The latest developments in automation have been incorporated in the design of the 61-inch and of its auxiliary equipment so as to maximize its efficiency.

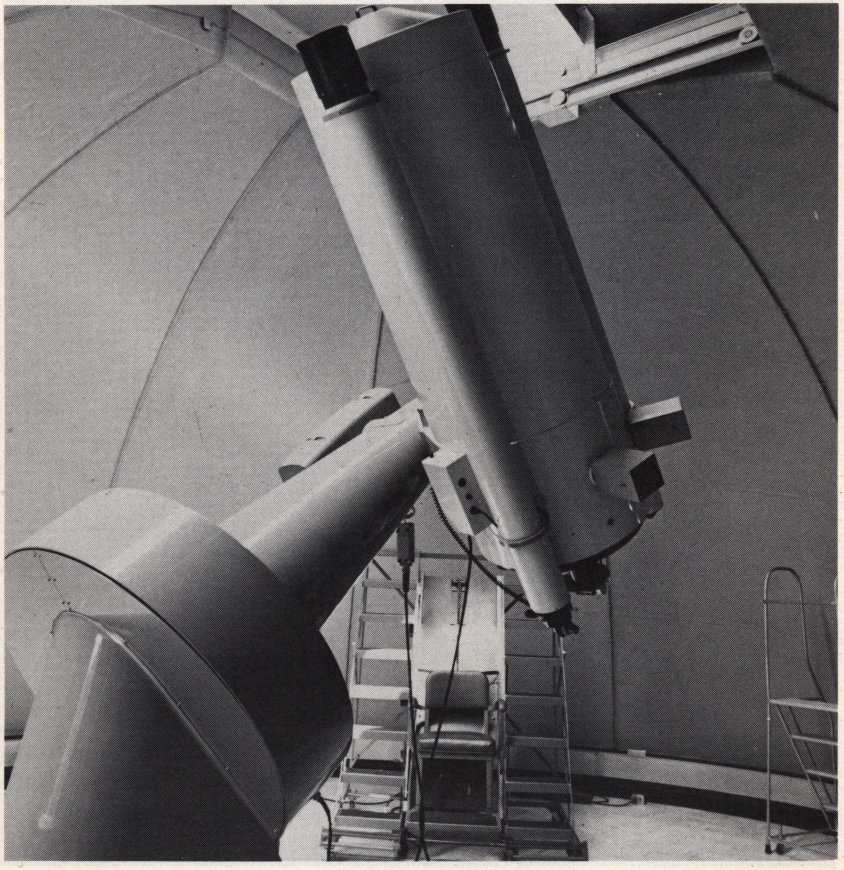
The 61-inch astrometric reflector is especially designed for measuring the distances of faint nearby stars by triangulation. The distances of these stars must be known before some of their fundamental properties, such as intrinisic luminosity and mass, can be accurately determined. In 1978, James W. Christy discovered a moon circling the planet Pluto, while examining photographic plates of Pluto taken with this telescope.



61-Inch Astrometric Reflector

A 40-inch Ritchey-Chretian reflector and the 61-inch reflector are used for observations to determine the brightnesses, colors, and spectral types of stars by photography or with photoelectric photometers. These data are needed to enable the astronomers in Washington, D. C., to correct the positions of the stars which are affected by the earth's atmosphere due to their color. Valuable information is derived from this data concerning the temperatures and densities of stars, their evolutionary history, and their distribution in space.

The largest telescope located on the Naval Observatory grounds in Washington, D. C., is a 26-inch refractor acquired in 1873, with which the two satellites of Mars were discovered by Prof. Asaph Hall in 1877. In 1893, when the Naval Observatory moved to its present location, the 26-inch lens was installed in a new tube and equipped with a new equatorial mounting. The telescope was completely modernized in 1960 and now includes motorized slow and fast motions and a control console. The 26-inch is presently used chiefly for visual and photographic observations of double stars



24-Inch Reflecting Telescope

to determine their orbital motions, masses, and distances. Also located on the grounds are a 24-inch reflector and a 15-inch astrograph, the latter telescope designed for the determination of accurate positions of celestial objects by photography. It is used in a long range program of observations of minor planets and comets.

A program of timing grazing occultations of stars by the moon is guided by the Naval Observatory. During a grazing occultation, the mountainous edge of the moon passes in front of a star, with the star subsequently reappearing between the mountains. From timings of the disappearances and reappearances it is possible to obtain unusually accurate positions of the moon. This provides data for improving the theory of the orbital motion of the moon and astronomical constants. Many amateur and professional astronomers are taking part in this program.

Observations of the moon are of special importance in studies of the earth's rotation and in the determination of longitude on the surface of the earth. All of these observations require that measurements be made at one or more points along the moon's limb. These measurements are seriously affected by lunar mountains and valleys presenting themselves in profile along the edge of the moon.

In order to provide a means of reducing all such measures to a common reference surface, somewhat similar to sea level on the earth, an accurate survey of the marginal zone of the moon was made in which the elevation of every surface feature likely to contribute to a limb irregularity at any time was measured.

After nearly two decades of dedicated effort, the results of this survey were published in the form of 1,800 charts and tables from which the correction required to reduce any measurement made along the moon's limb to a common datum surface may be calculated.

Lunar mountains and craters

Calculations of the predicted positions of the sun, moon, planets, and stars, necessary for determining geographic positions of ships or aircraft by celestial fixes, are made by the Nautical Almanac Office. The basic program was initiated in 1849. Each year this office prepares the American Ephemeris and Nautical Almanac, the Nautical Almanac, and the Air Almanac; the two latter publications are designed to meet the special needs of

surface and air navigation. The American Ephemeris and Nautical Almanac (to be called the Astronomical Almanac beginning with the 1981 edition) provides the fundamental data necessary for the preparation of the Nautical Almanac and the Air Almanac. Besides providing data for the use of astronomers in making observations and conducting astronomical investigations, it also provides the basic source of astronomical data for surveyors, lawyers, producers of commercial calendars and almanacs, and the general public.

Since 1960, the Nautical Almanac Office, Naval Observatory, and H. M. Nautical Almanac Office, Royal Greenwich Observatory, have collaborated in the production of these almanacs.

Most of the extensive computations for these volumes are made with electronic data processing equipment.

The Nautical Almanac Office also carries on investigations of the motions of the celestial bodies for the purpose of improving the mathematical theories and fundamental tables upon which the almanac is based.

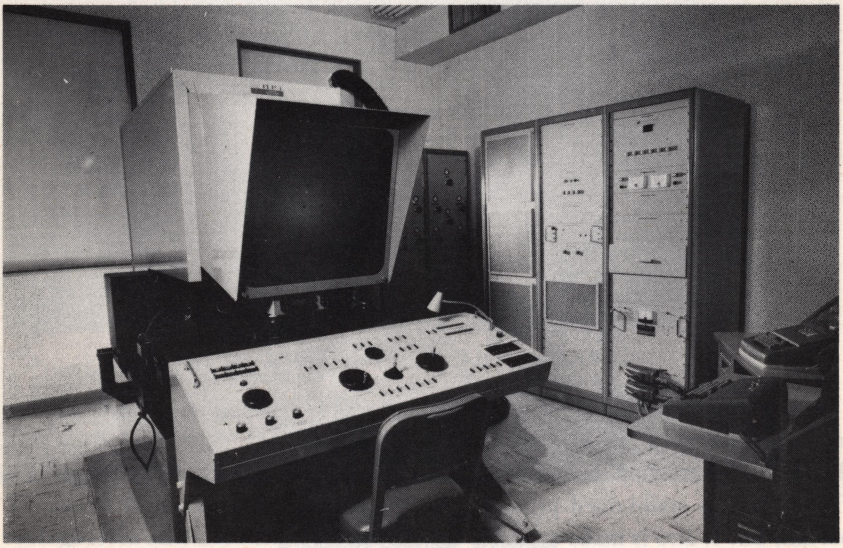
As an illustration of the support function of the Naval Observatory to other agencies, the Nautical Almanac Office, with cooperation of the H. M. Nautical Almanac Office, calculates Sight Reduction Tables (H. O. 249) for the Defense Mapping Agency Hydrographic/Topographic Center. These tables are used principally for the expeditious reduction of celestial sights in air navigation. One of these volumes must be recomputed every five years.

G. W. Hill Computing Center

A six volume set of Sight Reduction Tables (H. O. 229) intended for surface navigation has been prepared by the Nautical Almanac Office (with British cooperation) for the Hydrographic/Topographic Center. The production of these volumes involved the solution of one and one-half million spherical triangles.

Over the years the scientific staff of the Naval Observatory has made special efforts to develop and adopt new technological advances in order to improve the scientific output of the Naval Observatory, and thus to maintain its position at the forefront of the world's astronomical observatories. As early as 1939, the Naval Observatory started using electric accounting machines for the computation of navigational almanacs and scientific work in general. Later, a card-operated typewriter was designed to produce camera copy for the navigational almanacs directly from computer punched-card output. This system avoided the process of hand keying the copy for the almanacs in hot metal with its high incidence of error. In 1962, the Naval Observatory became the first organization within the Department of Defense to bridge the gap between electronic data processing and automatic photocomposing for offset printing. In this process, the output of an electronic data processor is used to control directly a high-speed photocomposing machine.

Another example of instrumental development at the Naval Observatory is the 61-inch astrometric reflector previously mentioned, which was especially designed to produce astrometric photographs of the highest accuracy. Associated with this telescope is an automatic measuring machine which determines with high precision the position of stellar images on photographic plates. It was with this machine that the use of temperature stable granite elements moving on air bearings was first introduced.



Automatic Measuring Machine

Similarly, one of the most important research programs carried out at the Flagstaff Station was the development of a special camera which intensifies the faint light from distant stars and nebulae. The resultant effect is an increase in plate speed of almost 50 times conventional photography. By using this camera, the 61-inch reflector becomes the equivalent of a telescope with a 300-inch aperture.

In a similar manner, new automatic techniques and instrumentation in transit circle observations have been developed over the years. Each step in the automation has produced not only higher accuracy in the observations with fewer incidents of human error, but also more efficient operation with proportionately higher output. Many of these innovations made at the Naval Observatory have been adopted at other observatories throughout the world.

U. S. Naval Observatory Library

The library of the Naval Observatory, containing some 75,000 volumes, is one of the leading astronomical libraries of the world. Many rare books and periodical sets dating back to the 15th century are preserved here. The library is maintained primarily for the needs of the staff in their official duties, but it also is made available for the use of other scientific investigators and interested scholars.

Illustrated below is the book plate of the Naval Observatory. Symbolically, it portrays Urania, the Muse of Astronomy, ascending and reaching up with the globe in her outstretched hands pointing out the way to unite the sky and the ocean to convey the idea that the study of navigation unites the sea with the heavens.

The motto "Adde Gvbernandi Stvdium: Pervenit In Astra, Et Pontvm Caelo Conivnxit" was taken from the Fourth Book of Astronomica of Manilius. Translated freely it says:

All hail to navigation, the art which reaches to the stars and bridges globe to heaven.

A number of recognized leaders in such fields as celestial mechanics, fundamental astronomy, time determination, photographic astrometry, and astrophysics are on the scientific staff of the Naval Observatory. The results of their research are published in scientific journals as well as in the Naval Observatory's own Publication series, and also are frequently reported at scientific meetings. Over one-third of the astronomers on the staff are Commission members of the International Astronomical Union which coordinates astronomical activities internationally.

The Naval Observatory is also trying to determine more accurately the precise period of rotation of the earth. The radio interferometer of the National Radio Astronomy Observatory in Green Bank, West Virginia, is used exclusively by the Naval Observatory in a program monitoring the precise positions of stellar radio sources. This instrument, which consists of radio telescopes 20 miles apart, connected by a radio link, is expected to greatly improve the day-to-day determination of Universal Time.

The gradual growth, diversification, and increasing complexity of the work of the Naval Observatory have been due to a growing demand for its services by other governmental and private organizations, and to recognition of its status as a truly national observatory. The advent of artificial satellites and space exploration, in particular, have placed additional demands for scientific services on the Naval Observatory. It is the official advisory agency on precise time and frequency as well as on astronomical questions to other government activities. It answers hundreds of astronomical queries each year from private organizations and individuals.

Although research in many areas of astronomy and support services to other agencies are likely to increase, the primary functions of the Naval Observatory, as established by law, will continue to require its major efforts to be directed towards greater precision in fundamental charting of the heavens, improvement in the predictions of positions of celestial bodies, and determination of accurate time.

REAR ADMIRAL LOUIS M. GOLDSBOROUGH (1805-1877), U. S. Navy. Lieutenant Goldsborough was the first Director, Depot of Charts and Instruments, 1830-1833. He was responsible for the establishment of the Depot of Charts and Instruments, which was the predecessor of both the Naval Observatory and the Navy Hydrographic Office. Its purpose was to purchase, maintain, and issue nautical instruments, books, and charts and to ascertain errors and rates of chronometers by making the required astronomical observations. To this end a small transit instrument was obtained and mounted in a circular building on what is now G Street, Northwest, between 17th and 18th Streets.

REAR ADMIRAL CHARLES WILKES (1798-1877), U. S. Navy. Lieutenant Wilkes succeeded Goldsborough as Director, Depot of Charts and Instruments, 1833-1837. In 1834 Wilkes moved the Depot to a site just north of the U. S. Capitol Building, where he erected a small observatory at his own expense. In 1837 he took command of his now famous Exploring Expedition of 1838 to the Pacific and South Seas.

CAPTAIN JAMES M. GILLISS (1811-1865), U. S. Navy. Lieutenant Gilliss succeeded Wilkes as Director, Depot of Charts and Instruments, 1837-1842. It was largely through his efforts that Congress appropriated money for a new and enlarged Depot (which ultimately became the Naval Observatory). He was in charge of drawing the plans and securing the required instruments. Gilliss later served as Superintendent, U. S. Naval Observatory from 1861 until his death in 1865.

COMMANDER MATTHEW F. MAURY (1806-1873), U. S. Navy. Lieutenant Maury succeeded Gilliss as Director, Depot of Charts and Instruments, 1842-1844 and served as Superintendent, U. S. Naval Observatory, 1844-1861. When the Depot was moved to its new quarters at 24th and E Streets, Northwest, in 1844, Maury became its first superintendent. His famous wind and current charts, which revolutionized commerce on the high seas during the era of clipper ships, were first published in 1846.

ASAPH HALL (1829-1907); Corps of Professors of Mathematics, U. S. Navy; Naval Observatory, 1862-1891; won distinction by his discovery of the two satellites, Deimos and Phobos, of Mars in 1877, using the 26-inch refractor, at that time the largest refractor in the world. Hall was associated with numerous important astronomical expeditions. He was in charge of the American party in the Transit of Venus Expedition at Vladivostok in 1874 and was the Chief Astronomer of the transit party stationed in San Antonio, Texas in 1882. His subsequent work included important observations of double stars and determinations of the orbits of the satellites of Saturn and the rotation period of Saturn.

SIMON NEWCOMB (1835-1909); Corps of Professors of Mathematics, U. S. Navy; Naval Observatory, 1862-1897; Director, Nautical Almanac Office, 1877-1897; redetermined the fundamental astronomical constants from a discussion of all the observations of the sun and planets made since 1750 at 13 different observatories. His redeterminations are the basis of the system of constants now in international use. He constructed improved fundamental star catalogs and more accurate planetary theories and tables. Newcomb also made notable contributions to the lunar theory and to the determination of the velocity of light.

GEORGE W. HILL (1838-1914); Naval Observatory, 1861-1892; was recognized during his day as perhaps the greatest master in the highest and most difficult field of astronomy, that of celestial mechanics. His greatest works were the construction of the theory of the planets Jupiter and Saturn and his research on and contribution to the lunar theory.

WILLIAM HARKNESS (1837-1903); Corps of Professors of Mathematics, U. S. Navy; Naval Observatory, 1862-1899; is best remembered in astronomy for his laborious and ingenious research on solar parallax and its related constants. He investigated the behavior of the magnetic compass under the influence of the heavy iron of ironclad ships following the Civil War. He was a member of the Transit of Venus Commission in 1871. For many years practically every instrument at the Naval Observatory, if not of his own design, embodied features which he suggested.

WILLIAM S. EICHELBERGER (1865-1951); Corps of Professors of Mathematics, U. S. Navy; Naval Observatory, 1896-1929; Director, Nautical Almanac Office; is best remembered in astronomy for his contributions, both observational and theoretical, to the fields of fundamental meridian astronomy. In the early part of the 20th century he established the fundamental meridian circle programs of the Naval Observatory for the determination of the positions and motions of the standard stars and of the sun, moon, planets, and satellites. His catalog of 1,504 standard stars (1925) was adopted as an international standard and used in the national ephemerides until 1940.

HERBERT R. MORGAN (1875-1957); Ph.D., University of Virginia, 1901; Naval Observatory, 1901-1905, 1907-1944; made notable contributions to our knowledge of the fundamental positions of the stars, position of the equator, motion of the equinox, the constants of aberration, nutation and precession, and the orbital elements of the planets. The proper motions of his N30 catalog of 5,268 stars have served as a starting point for researchers on the constant of precession, luminosities of the nearest Cepheids, and the structure of the galaxy.

CHESTER B. WATTS (1889-1971); Ph.D., University of Indiana; Naval Observatory, 1911-1959; Director, Six-Inch Transit Circle Division, 1934-1959. He was recognized as one of the world's leading experts in positional astronomy and made notable contributions in the area of astronomical instrumentation. His publication "The Marginal Zone of the Moon" represents a gigantic effort to describe in graphical form corrections to limb observations of the moon accurate to within 0.05 seconds of arc.

WALLACE J. ECKERT (1902-1971); Ph.D., Yale University; Naval Observatory, 1940-1945; Director, Nautical Almanac Office; was known for his timely contributions to the lunar theory, calculations for the ephemeris of the moon and improved tables of the outer planets. He was the first government scientist to use punched-card computing machinery for scientific calculations. His outstanding success in using the computer to produce a new Air Almanac (1941) and in extending the production to camera copy for the daily pages (1942), started a chain of events that has made it possible for the U. S. Navy to be foremost in scientific data processing and automatic production methods for printing.

GERALD M. CLEMENCE (1908-1974); Naval Observatory, 1930-1963; Director, Nautical Almanac Office, 1945-1958; was known internationally for his studies of the motions of the principal planets, particularly for his theory of the motion of Mars, and studies of the system of astronomical constants. He co-authored the basic reference volumes *Methods of Celestial Mechanics* and *Spherical Astronomy*. He received the Gold Medal of the British Royal Astronomical Society in 1965.

FRANCES P. SCOTT (1906-1974); Naval Observatory, 1929-1970; Director, Seven-Inch Transit Circle Division, 1948-1970; D.Sc. (hon.), University of South Florida, 1974. His principal work was the determination of the positions and motions of the stars. He was an active leader in international programs to establish the positions of a network of 40,000 stars covering the entire sky. He supervised the compilation of three extensive star catalogs, two of which were based exclusively on observations made at the Naval Observatory. The third, compiled from over 350,000 observations made at 11 cooperating observatories, gives accurate positions for nearly 22,000 northern reference stars.

OFFICERS IN CHARGE OF DEPOT OF CHARTS AND INSTRUMENTS

LT L. M. Goldsborough
6 Dec 1830–11 Feb 1833

LT Charles Wilkes
12 Mar 1833–11 Jun 1837

LT James Melville Gilliss
14 Jun 1837–11 Jul 1842

LT Matthew F. Maury
11 Jul 1842–1 Oct 1844

SUPERINTENDENTS OF THE U. S. NAVAL OBSERVATORY

CDR Matthew F. Maury
1 Oct 1844–20 Apr 1861
CAPT James M. Gilliss
23 Apr 1861–9 Feb 1865
RADM Charles Henry Davis
28 Apr 1865–15 May 1867
RADM Benjamin F. Sands
15 May 1867–23 Feb 1874
RADM Charles H. Davis
23 Feb 1874–18 Feb 1877
RADM John Rodgers
1 May 1877–5 May 1882
VADM Stephen C. Rowan
1 Jul 1882–1 May 1883
RADM Robert W. Shufeldt
1 May 1883–21 Feb 1884
RADM Samuel R. Franklin
24 Feb 1884–31 Mar 1885
COMMO George E. Belknap
1 Jun 1885–7 Jun 1886
COMMO Robert L. Phythian
15 Nov 1886–28 Jun 1890
CAPT Frederick V. McNair
28 Jun 1890–21 Nov 1894
COMMO Robert L. Phythian
21 Nov 1894–19 July 1897
CAPT Charles H. Davis, II
19 Jul 1897–16 Apr 1898
COMMO Robert L. Phythian
18 May 1898–1 Nov 1898
CAPT Charles H. Davis, II
1 Nov 1898–1 Nov 1902
RADM Colby M. Chester
1 Nov 1901–28 Feb 1906
RADM Asa Walker
28 Feb 1906–12 Nov 1907
RADM William J. Barnette
2 Dec 1907–19 Apr 1909
COMMO T. E. DeWitt Veeder
20 Apr 1909–16 Oct 1911
CAPT Joseph L. Jayne
16 Oct 1911–11 Feb. 1914
CAPT John A. Hoogewerff
14 Feb 1914–31 Mar 1917
RADM Thomas B. Howard
31 Mar 1917–4 Mar 1919
RADM John A. Hoogewerff
4 Mar 1919–8 June 1921
CAPT William MacDougal
1 Aug 1921–5 Oct 1923
CAPT Edwin Pollock
5 Oct 1923–19 Sep 1927
CAPT Charles S. Freeman
19 Sep 1927–21 May 1930
COMMO J. F. Hellweg
9 Jun 1930–18 Feb 1946
CAPT Ralph S. Wentworth
18 Feb 1946–1 Sep 1946
CAPT Guy W. Clark
1 Sep 1946–20 Apr 1949
CAPT George W. Welker
20 Apr 1949–27 Apr 1951
CAPT Frederic A. Graf
23 Jul 1951–30 Jun 1956
CAPT Charles L. Freeman
17 Oct 1956–21 Aug 1957
CAPT Carl G. Christie
8 Jan 1958–30 Jun 1959
CAPT Byron L. Gurnette
30 Jun 1959–30 Jun 1961
CAPT Alvin W. Slayden
30 Jun 1961–30 Jun 1962
CAPT Thomas S. Baskett
1 Jul 1962–30 Jun 1965
CAPT Joseph M. McDowell
10 Sep 1965–30 Jun 1968
CAPT J. Maury Werth
1 Jul 1968–31 Aug 1970
CAPT John R. Hankey
1 Sep 1970–30 Jun 1972
CAPT Edward A. Davidson
30 Jun 1972–28 Sep 1973
CAPT Sherwin J. Sleeper
28 Sep 1973–17 Sep 1976
CAPT Joseph C. Smith
17 Sep 1976–Present

Old Naval Observatory Building (1844-1893) 24th and E Streets, N.W., Washington, D. C.

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